



## HONORED FOR **TEACHING EXCELLENCE**

*At a top research university like Northwestern, it's often professors' research achievements that make headlines. But ask students what inspired them most during their college or graduate school years and most will point to an exceptional class that opened their eyes to a new passion or an outstanding teacher who went above and beyond.*

*The Charles Deering McCormick Award recognizes faculty members across Northwestern who demonstrate outstanding performance in classroom teaching. Of four such awards given across the University in 2012, two went to McCormick faculty members.*

***Bruce Ankenman**, associate professor of industrial engineering and management sciences, is a founding faculty member and current codirector of the Segal Design Institute and serves as codirector of McCormick's well-known freshman design course, Design Thinking and Communication. As a researcher, Ankenman develops simple-to-use yet statistically powerful tools for the design and analysis of experiments. **John Torkelson**, Walter P. Murphy Professor of chemical and biological engineering and of materials science and engineering, has been a faculty member at McCormick since 1983, teaching polymer chemistry, physics and engineering, and heat transfer, and researching polymer properties, processes, and manufacturing.*

*McCormick magazine spoke with Ankenman and Torkelson about their work in the classroom, memorable moments, and advice for the next generation of top teachers.*

**McCormick:** Bruce, you became a professor after a career in industry. Why did you make the switch?

**Ankenman:** In the '80s I was a product engineer in the automotive industry. In essence, I spent most of my time collecting data about my product and making decisions about how to improve it. It was difficult at first, and then I realized why: during my entire undergraduate engineering education no one had ever taught me how to collect data and make decisions from it. And I went to a good school! I realized that there was this hole in engineering education, and I thought, I've worked in industry, I know what engineers need. I'm very well suited to fix this problem. Around the same time I came to another realization: I wanted my work to be more personal. I come from a family that worked in medicine, a field that's deeply involved in people's lives. I decided I wanted to have that kind of personal impact in my own career.

**McCormick:** John, what led you into teaching?

**Torkelson:** Above all, I knew I wanted to work with students. It wasn't for lack of options. After graduate school I had offers from a national research lab and industrial research laboratories, but I really wanted to have an impact on students, so I chose academia. I came to Northwestern 29 years ago; I defended my thesis on a Wednesday, arrived here on Friday, and started teaching 10 days later. And Northwestern has worked out very well for me. We have excellent students, a collaborative research environment, great shared facilities, and because of our small class sizes I can really get to know my students.

**McCormick:** How would you describe your teaching styles?

**Ankenman:** My style varies depending on the class. For more advanced students, PowerPoint presentations can be very effective. But for introductory-level courses, I prefer the chalkboard, where students can remain engaged and watch problems unfold. Over the years I've picked up a number of techniques to get

students interacting, such as breaking them into small discussion groups or posing a problem to the group and asking them to vote on the correct answer. Demonstrations are also fun; I have my Introduction to Statistics students measure the volume of balloons to get them thinking about process output, and I build a discussion about statistical guarantees around how potato chip bags always seem underfilled. Teaching Design Thinking and Communication is also project oriented; students spend the entire first quarter designing devices for people with disabilities. The goal is always to get students to be better decision makers. This also comes through in my tests. I will never ask a question like "Is the target value in the confidence interval?" That's statistics talk. The question will be "Should you sue the potato chip manufacturer for falsely claiming how many chips they gave you?"

**Torkelson:** I'm also a chalk-and-blackboard instructor. One main characteristic of my classes is that I interact with students and frequently call on them to answer questions. Not only does it help me pick up on students' names, but it ensures they're mentally engaged; I don't want my students to just be stenographers in my class. On occasion I bring something small into class for a demonstration. For example, I bring Silly Putty in to my Intro to Polymers class, and my students enjoy that. I also crack some jokes, mainly at my own



McCormick professors Bruce Ankenman (left) and John Torkelson won two of the University's four Charles Deering McCormick 2012 Awards for teaching.

expense. I'm pretty self-deprecating. My classes are rigorous, but it's always good if students can laugh and smile a little bit, too. And if 99.9 percent of the jokes are directed at me, they don't have to worry about any discomfort associated with that laughter.

**McCormick: What have been some of your most memorable moments at McCormick?**

**Ankenman:** My proudest moments are when someone sends me an email three years after graduation and says, "What you taught me helps me in my job every day." That was my goal in leaving industry, after all, to help engineers do a better job of collecting data and analyzing it. Doing well on a test is great, but those emails really make me proud.

There have been some less-than-pleasant memorable moments, too. In Design Thinking and Communication we host guest lecturers once per week for all the sections of the course. On one occasion the lecturer accidentally unplugged the University's computer and set off the security alarm. It was painfully loud, and we could not figure out how to turn it off. But what could we do? We had 250 students in the room, so the lecture had to begin. I stood there with my hand pressed over the alarm trying to muffle the sound for 20 minutes until tech support came and saved us. It was pretty bad.

**Torkelson:** For me, the most rewarding moments occur when I see a light bulb go off in a student's mind. For a variety of reasons, some students come into my class with a deficiency in their understanding of a subject. After working with them in class or during office hours, I often see that light turn on. After that, things instantly change for them; you really see their confidence grow. That's something I take pride in. I've also had a number of students who have won or been finalists for national research awards or who have gone on to become successful academics themselves. Watching my students become successful is very rewarding. I can't pay back everything I got from my own professors, but helping my students succeed feels like I am paying it forward.

If you were to ask my students about memorable moments in my class, they might have other ideas. For example, I often treat my classes to something I call the "polymer dance" to illustrate the ability of polymer chains to diffuse. The actual dance moves vary. Sometimes it looks akin to a foxtrot, other times it harks back to my days in graduate school on the disco dance floor. In any case, the students are amazed that at my age I still have a lot of flexibility.

**McCormick: What advice would you give to someone considering a career in academia?**

**Ankenman:** Get involved in research with a professor—it will really give you a leg up. Nobody really understands what research is until you do it, and research varies heavily from field to field. And to whatever extent you can, try to get practical experience and work that into your teaching. I've found that students respond well to teaching that comes from real-world experience. If they just learn in order to pass a test, it's not going to stick with them as much as when they are learning because they believe they will actually use the material. As a teacher you have to convince them your topic is going to be worth knowing.

**Torkelson:** Take the time to prepare yourself for the classroom. I think effective teaching requires you to do a few basic things well, and that's about 95 percent of the job. You need to know at the outset what it is you're trying to accomplish in the class as a whole, and then create a logical syllabus so one topic leads to the next. Spend the time each day to be ready to go into the classroom and be effective. That doesn't mean you can't make mistakes. I still do. Of course, I tell the students I don't make mistakes; I tell them every time it looks like I've made a mistake that I'm really just utilizing a pedagogical technique to put them at ease. Above all, remember your audience. It is not your job as a professor to tell people about a subject in the way you currently think about that subject. Your job is to consider at what level your audience is and to challenge them effectively. **M**